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(71) Applicant
Wallace Business Services Limited
(Incorporated in the United Kingdom)

13 Bridge Avenue, Maidenhead, Berkshire, SL6 1RR,
United Kingdom

(72) Inventors
Robert Wallace
Alan George Kevin Wallace

(74) Agent and/or Address for Service
D Young & Co
10 Staple Inn, London, WC1V 7RD, United Kingdom

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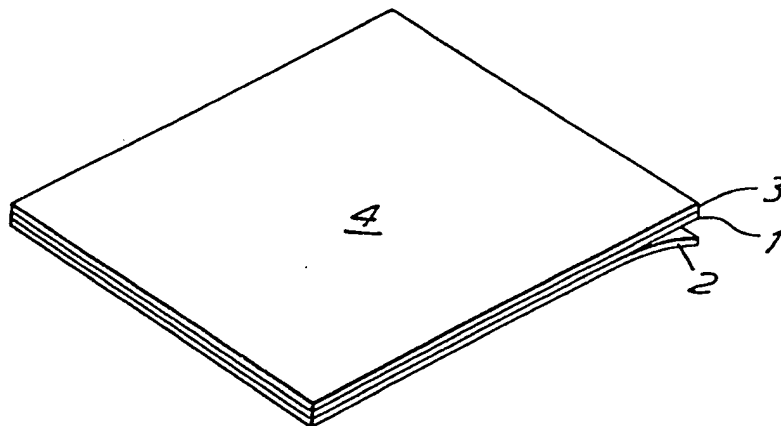
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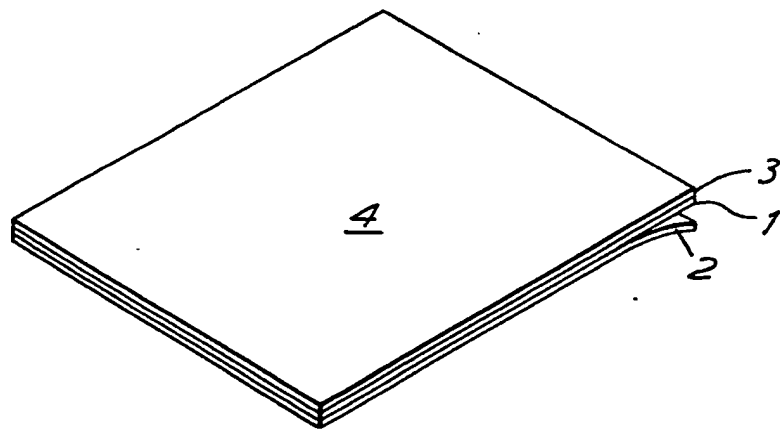
(54) Plastics film laminates having non-adhesive cling properties

(57) A laminated sheet product having inherent, non-adhesive cling properties, comprises a first sheet of dimensionally stable rigid or semi-rigid PVC (3) and laminated thereto a preformed sheet (1) of supple polyvinyl chloride, said supple PVC sheet having a plasticiser content in excess of about 35 parts by weight and providing said laminated sheet product with said non-adhesive cling properties.



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PLASTICS FILM LAMINATES HAVING
NON-ADHESIVE CLING PROPERTIES

5 This invention relates to laminated sheet products having the ability to adhere, or cling, to various smooth surfaces, such as glass or tile, and to itself, without extraneous adhesive, i.e. by virtue of the properties of the film or laminate itself.

10 So called "cling" films and plastic sheets having the ability to cling to a smooth surface, usually to a highly polished or glazed, hard surface such as to window glass, ceramic wall tiles, etc., but also to some painted and plastics surfaces, have revolutionised the packaging and display industries in recent years. Such films are extensively used, for example as window stickers and licence or tax disc holders in motor vehicles, advertising stickers of all kinds, as write on/wipe off boards or sheets capable of
15 adhering to a variety of surfaces, as book and photograph album covers, as toys, childrens games, educational games and toys, wall charts and simply as packing and display materials of all kinds.

20 Such films usually possess a highly polished or calendered surface, which is substantially free of surface imperfections, and whilst the ability of the film to cling to itself, or to another surface, particularly another glazed or polished surface, is thought to be due to a large extent to electrostatic forces, it is clear that ability of the film or laminate to cling to itself, or to another surface, is highly dependent upon the chemical composition of the film, and the plasticiser content.

25 One such material is supple polyvinyl chloride, supple PVC, which is a clear (or opaque), supple highly plasticised calendered PVC with a plasticiser content in excess of 35 parts by weight. In the print and display industry, supple PVC is supplied with a peel-off backing paper, and is generally known as "window cling". The film may be printed with logos, legends, etc., often
30 in reverse lettering, so that when the backing sheet is removed, and the sticker applied to a window, the logo or legend is visible the right way round through the glass. Of course, the reverse side of the film may also be printed with logos or legends the right way round, so as to be visible from the inside, rather than, or in addition to, the outside of the glass. This type
35 of product is widely used in the window cling market, but is generally accepted to be a short term promotional product, i.e. with a life of up to 12

months, depending on the number of times it is peeled off and repositioned on the surface (or onto a different surface). Problems associated with supple PVC are, however, that it is dimensionally unstable (i.e. it stretches) and is therefore difficult to print and convert, it is difficult to surface coat, and tends to attract dust and dirt due to electrostatic build up on its exposed surfaces.

Various other PVC products are on the market, including PVC film which has been specifically treated, e.g. by calendering and/or the use of pressure and heat, to introduce a permanent electrostatic charge into the film. Such material is, however, limited in its adhesion to glass and cannot easily be kiss or die cut to pattern. Also known are PVC films to which a pressure sensitive adhesive has been applied and which do provide a degree of releasability or peelability from the surface to which it is applied, and a degree of resealability. That however, is due to the properties of the adhesive, rather than the inherent properties of the film.

In accordance with the present invention, the problem of dimensional instability and poor printability of supple PVC is overcome by laminating the supple PVC to a dimensionally stable surface sheet of dimensionally stable material, which could be paper or even a metal foil, but is preferably a dimensionally stable polymeric film, for example and preferably a dimensionally stable PVC film, e.g. of polymeric semi-rigid or rigid PVC film, i.e. PVC containing less than 35% by weight of plasticiser. The dimensionally stable surface film may be clear or opaque, depending on the nature of the end use, but preferably a dimensionally stable, clear film will be used, the supple PVC film thus acting as an "adhesive" film by means of which the laminate adheres or clings to the specified surface, i.e. to glass or other glazed surface, or to painted, polished or plastics surface as the case may be.

A section through a preferred laminate construction according to the invention on a much enlarged scale is illustrated in the accompanying drawing.

In the drawing, the supple PVC film which acts as the "adhesive" film is indicated at 1, and is temporarily protected by a peel-off sheet of backing paper or tissue or plastic 2.

Laminated to the "upper" surface of the supple PVC film 1 is a dimensionally stable film 3, e.g. a film rigid or semi-rigid PVC film

(containing less than 35% by weight of plasticiser), preferably a transparent or clear rigid or semi-rigid PVC film, but which may, according to the end use, be opaque and/or coloured. For example, as a self cling sheet material for use as a write on/wipe clean notice board or sheet, the dimensionally stable film 1 may be opaque rather than transparent. But for "see through" applications, i.e. where the exposed surface 4 of the dimensionally stable film is reverse printed with a legend or logo, both the dimensionally stable film 3 and the supple PVC film 1 will, of course, be transparent.

The supple PVC film may be laminated to the dimensionally stable film in any suitable manner, depending on the nature of the dimensionally stable film, i.e. whether paper, plastics or metal. For example where two plastics films are used, e.g. two PVC films, one rigid and one supple, the two films can be welded together by heat and/or pressure, by casting or coating or extruding the supple PVC onto the dimensionally stable film and/or by calendering the supple film onto the rigid film, or by a combination of such techniques. An intermediate adhesive film may be applied between the two, but usually this will not be necessary.

The relative thickness of the two films is not critical, and the following thicknesses are merely given as a guide:

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| | <u>General Range</u> | <u>Preferred Range</u> | <u>Optimum</u> |
|--|----------------------|------------------------|--------------------|
| Supple PVC film | 20-100 microns | 20-50 microns | approx 35 microns |
| Dimensionally stable PVC or other surface film | 50-200 microns | 50-120 microns | approx 100 microns |

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As the supple PVC film there may be used any PVC film containing a relatively large amount of plasticiser, i.e. in excess of about 35 parts by weight, and having the desired cling properties.

As the dimensionally stable PVC film there may be used any PVC film which has the required dimensional stability and rigidity, and will usually be a monomeric, polymeric or rigid PVC film containing less than about 35 parts by weight of plasticiser.

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Whilst by reason of cost and ease of bonding to the supple PVC film, e.g. by straightforward welding under heat and/or pressure in one or more calendering operations, the "rigid" layer is preferably a rigid, dimensionally stable PVC film, other polymer films may be used, e.g. polypropylene, polyamide, polyester, polystyrene, polycarbonate, etc. It is also envisaged

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that paper and metal foils can be provided with non-adhesive, cling properties in a similar manner, i.e. by laminating thereto a film of supple PVC thereby imparting non-adhesive cling properties to the paper or metal foil.

CLAIMS

1. A laminated sheet product having inherent, non-adhesive cling properties, comprising a surface sheet of dimensionally stable material having bonded to one surface a film of supple polyvinyl chloride, said supple PVC film having a plasticiser content in excess of about 35 parts by weight and providing said laminated sheet product with said non-adhesive cling properties.
2. A laminated sheet product according to claim 1, wherein said surface sheet is a film or sheet of dimensionally stable polymeric material, paper or metal foil.
3. A laminated sheet product according to claim 1 or 2, wherein said surface sheet and said supple PVC film are bonded together by heat and/or pressure, casting, extruding, coating or calendering.
4. A laminated sheet product according to claim 1, 2 or 3, consisting of a first surface film of dimensionally stable rigid or semi-rigid PVC. i.e. having a plasticiser content of less than 35 parts by weight, and a second film of supple PVC bonded to the first film to provide said first film with said non-adhesive cling properties.
5. A laminated sheet product according to claim 4, wherein the first and second films are both transparent.
6. A laminated sheet product according to claim 5, wherein said first film is reverse printed on its exposed surface with a legend or logo.
7. A laminated sheet product according to claim 1, 2, 3 or 4, wherein either or both said first and second films are opaque.
8. A laminated sheet product according to any one of claims 1 to 7, wherein the film of supple PVC is temporarily protected by a peel-off backing sheet.

9. A window cling sticker, wall chart or the like comprising a laminated sheet product as claimed in any one of claims 1 to 8.